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Tree Pest Leaflets

THE EUROPEAN SPRUCE SAWFLY

(*Diprion polytomum* (Hartig)

PRESENT STATUS IN THE UNITED STATES
A REVISION OF TREE PEST LEAFLET, NUMBER 6

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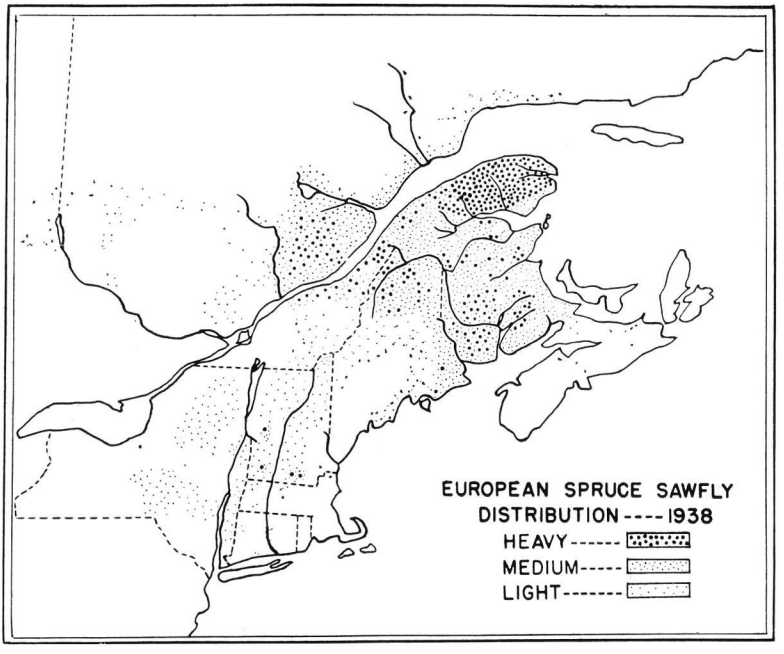

Figure 1—General distribution of European Spruce Sawfly in America in 1938. "Heavy" indicates severe defoliation, with most of old and some of new foliage eaten; "medium" indicates noticeable feeding on old foliage; "light" indicates presence of larvae but no noticeable defoliation.

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THE EUROPEAN SPRUCE SAWFLY

(*Diprion polytomum* (Hartig)

History and Distribution:—In 1930 the European spruce sawfly was discovered causing serious defoliation of spruce in the Gaspe Peninsula of Canada. Since that time 60% of the white spruce and 25% of the black spruce in that region has been killed over an area of approximately 3,000 square miles. The insect has also become prevalent in from medium to heavy infestations throughout the whole of the Gaspe peninsula, New Brunswick, and a large area in the Province of Quebec. It is also present in outbreak form in northern Maine and at several points in New Hampshire and Vermont. Figure 1 shows the known distribution at the present time.

During 1937 and 1938 the Bureau of Entomology and Plant Quarantine, in cooperation with the States of Maine, New Hampshire, Vermont, and New York and several lumber and paper companies, conducted an intensive survey to determine the range and the status of the insect in this country. Generally speaking the survey showed the spruce sawfly to be present in at least small numbers wherever spruce was found. It is also present in spruce plantations examined in Massachusetts, Connecticut, and northern New Jersey. In Maine it was estimated that about 15,000 acres showed noticeable defoliation in 1937. During 1938, according to H. B. Peirson, the severity of the infestation increased considerably throughout northern Maine and Washington County. In New Hampshire there is a very heavy infestation at Dublin on the northern slope of Mt. Monadnock and around Dublin Lake, and at a smaller area near the Temple-Peterboro line. A total of about 5,000 acres of merchantable red spruce are affected at these two points. No other areas of noticeable defoliation were found in New Hampshire, but in Pittsburg in the northern part of the State sound cocoons were quite plentiful in duff samples taken near Mt. Kent. In Vermont there is a heavy infestation in the central part of the State at Lincoln which involves several thousand acres, and a very severe outbreak in the southern part of the State covering about 5,000 acres in the towns of Wilmington, Marlboro, Dover, and Newfane. Slight but noticeable defoliation was also observed near Lincoln on Mt. Ellen, Mt. Abraham, and Mt. Battell, and on Green Peak in Dorset. In New York the sawfly is rather numerous in some natural stands in the Adirondacks, but no defoliation was observed. A few plantations of young Norway spruce in both the Adirondack region and the southeastern part of the State have a medium to heavy infestation and show noticeable defoliation.

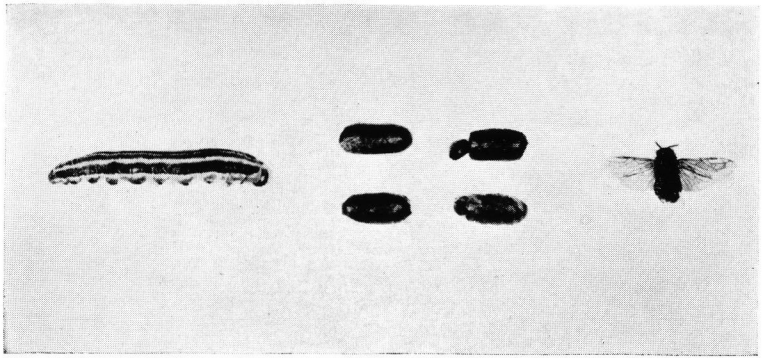
Only a small number of trees have been killed in the United States as yet. Nevertheless trees over large areas in the centers of heavy infestation have been so severely defoliated that it is questionable whether they can sur-

vive further defoliation. Unfortunately there is a heavy cocoon population in hibernation at most of these points.

Host Trees:—All species of spruce that occur within the infested area are attacked regardless of age or size. Other conifers are immune.

Symptoms of Damage:—The larvae first feed on the old foliage, and defoliation is usually heaviest in the lower part of the crown. Larval droppings, which are light green, cylindrical pellets that later turn dark brown, are conspicuous at the base of the tree. Cocoons may be found in mossy places, under sticks, or in the duff on the ground.

Description of Insect and Life History:—The spruce sawfly over-winters in a golden to dark-brown cocoon (Figure 2, B) about two-fifths of an inch long which is spun in the litter or moss beneath the trees. Transformation to the adult insect takes place in the spring. Males are very rare, and reproduction takes place without fertilization. The female (Figure 2, C) is a rather stout four-winged fly which is black with yellowish markings on the abdomen, thorax, and head. Eggs are laid singly in slits cut in the old needles, and they hatch in about a week. The young larvae begin feeding at the tips of the needles. At first they are yellowish green and only about one-eighth of an



A B C

Figure 2—European Spruce Sawfly: A, larva (x 1-3); B, cocoons, and C, adult female. (About natural size.)

inch long. When nearly full grown (Figure 2, A) they are darker green with five narrow, longitudinal white lines, and they average about four-fifths of an inch long. The body shortens somewhat and the white lines disappear after the larva becomes full fed, and it then drops to the ground and spins its cocoon.

In the Gaspe peninsula one brood of larvae develops annually. However, a high percentage of the cocoons may remain in hibernation 2 or more years before adults emerge. In Maine and New Hampshire there are two broods of larvae each year, and apparently most of the cocoons formed by the second brood produce adults the following spring.

Control:—Shrews and ground-feeding rodents sometimes destroy as high as 50 percent of the cocoons, and at times a considerable number of larvae are killed by disease. Native insect parasites, on the other hand, are negligible. Since a number of parasites are known to attack the sawfly in Europe, the Canadian government is engaged in an extensive program of foreign parasite

introduction. One introduced species, *Microplectron fuscipennis* (Zett.), is a tiny, wasplike insect. About 25 individuals develop in a single sawfly cocoon. This species is readily bred in the laboratory, and the Canadian government has liberated about 300 million of them. In 1938 the State of Maine reared and liberated 37 million, and the Bureau of Entomology and Plant Quarantine reared and liberated about 5 million. The species has already become established at many points in Canada and the United States. One other species, *Exenterus marginatorius* (F.), a larval parasite, has also become definitely established in Canada.

It is not believed that parasites alone can control the spruce sawfly, but along with other factors they may help in reducing the sawfly infestations to a point where many trees can survive attack. It will be many years before the parasites can breed up sufficiently so that a proper evaluation of their importance can be made. This method of control, however, seems to be the only method known of fighting this pest over large forested areas.

Ornamental trees can be well protected by spraying with lead arsenate at the rate of 3 pounds to 100 gallons of water, with about 4 fluid ounces of fish oil or linseed oil added as a sticker for each pound of lead arsenate. In New England one application of this spray during the first week in June should give sufficient protection for a season.